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Performance of some fine rice varieties in transplant *Aman* season

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Abstract: A field experiment was carried out at the Agronomy Field Laboratory, Bangladesh Agricultural University, Mymensingh during transplant *Aman* season from July to December 2008 to evaluate the yield performance of some local and HYV aromatic rice varieties. The experiment was laid out in a randomized complete block design with four replications. The basal dose of fertilizers applied into the soil were one third of urea @ 120 Kg ha^{-1}, TSP @ 60 Kg ha^{-1} , MP @ 35 kg ha^{-1}, Gypsum @ 10 kg ha^{-1} and Zink sulphate @ 5 kg ha^{-1}. Nitrogen was also applied in two splits at 20 and 40 days after transplanting. Fertilizers significantly affect on the number of effective tillers hill^{-1}, number of non-effective tillers hill^{-1}, number of grains panicle^{-1}, unfilled spikelets panicle^{-1}, 1000-grain weight, grain yield, straw yield, biological yield and harvest index of aromatic rice varieties. The highest grain yield (5.00 t ha^{-1}), straw yield (6.40 t ha^{-1}), number of effective tillers hill^{-1} (11.81) and total number of grains panicle^{-1} (166.75) were found in V_6 (BRRI dhan30) treatment and the lowest grain yield (2.69 t ha^{-1}), straw yield (4.53 t ha^{-1}), number of effective tillers hill^{-1} (9.67) and total number of grains panicle^{-1} (134.00) were recorded from V_3 (Badshabhog), V_8 (BRRI dhan38) and V_1 (Kalojira) treatment, respectively. From the findings of the present study, it may be concluded that aromatic rice cv. BRRI dhan30 appears to be better than other varieties.
Key words: Transplant *Aman*, performance, aromatic rice and yield.

Introduction

Bangladesh is an agrarian country. Most of her economic activities depend on agriculture. Agriculture in Bangladesh is dominated by intensive rice cultivation. More than 78% of her population is directly dependent on agriculture. In Bangladesh about 80% of the total cultivable land is used for rice cultivation. About 10.8 million hectares of land were used for rice cultivation which produced 26.2 million metric tons of paddy during 2003-2004 with an average of 2.3 tons per hectare (BBS, 2004). Although, cropping pattern of Bangladesh are mainly rice based, the yield of rice is quite low as compared to that of the other agriculturally advanced countries of the world, such as Japan, China and Korea Republic, where per hectare yield is 6.2, 6.0 and 7.0 ton, respectively. (FAO and UNDP, 1999).

In Bangladesh more than four thousand local landraces of rice were grown in different parts of the country. Some of these e.g. Kataribhough, Kalizira, Basmati etc. have very nice quality i.e. fineness, aroma, test, and protein contents. These are generally low yielding (Gangaiah and Prasad, 1999). The aromatic rice of some special group which is considered best in quality is the most highly valued rice commodity in Bangladesh agricultural market having small grain, pleasant aroma and soft texture upon cooking (Dutta *et al.*, 1998).

In recent years cultivation of aromatic fine rice is becoming popular due to its high price and export potential (Gangaiah and Prasad, 1999). In India, Basmati rice varieties are in demand because of their long slender aromatic grain which upon cooking exhibit high volume expansion (Siddu *et al.*, 2004).

At present, BRRI already developed some modern varieties of aromatic rice, among them BRRI dhan30, BRRI dhan34, BRRI dhan38, BRRI dhan39 are noteworthy, which recorded higher yield also in comparison to the other local conventional aromatic rice varieties. The present study has, therefore, been undertaken to evaluate the yield performance of some fine rice varieties in transplant *Aman* season.

Materials and Methods

The experiment was conducted at the Agronomy Field Laboratory, Bangladesh Agricultural University, Mymensingh during the period from July to December 2008 to study the yield performance of some aromatic rice varieties in transplant *Aman* season. The topography of the soil in experimental field was medium low and fertile with moderate drainage facilities. The soil is loam in texture. The experiment consisted of the treatments viz. V_1= Kalojira, V_2= Tulsimala, V_3= Badshabhog, V_4= Dulabhog, V_5= Jirashail, V_6= BRRIdhan 30, V_7= BRRIdhan 34, V_8= BRRIdhan 38 and V_9= BRRIdhan 39. In this experiment, local aromatic rice varieties viz. Kalojira, Tulsimala, Badshabhog, Dulabhog and Jirashail; and modern high yielding aromatic rice varieties viz. BRRIdhan 30, BRRIdhan 34, BRRIdhan 38 and V9= BRRIdhan 39 were used as the test crop. The experiment was laid out in a randomized complete block design which four replications. The size of unit plot was 10 m^2 (4.0 m x 2.5 m). The treatments were randomly distributed to the plots within a block. The experimental plots were fertilized with one third of urea, triple super phosphate, muriate of potash, gypsum and zinc sulphate as basal dose at the rates of 120kg, 60kg, 35kg, 10 kg and 5 kg ha^{-1}, respectively. Nitrogen was top dressed in the form of urea in two equal splits. Thirty days old seedlings were transplanted in 20cm × 15cm spacing with three seedlings hill^{-1}. Intercultural operation and other measures including pest and disease control and one time supplementary irrigation were applied as and when necessary. The crops were harvested with sickle at full maturity. The maturity of crops was determined when some 70% of the seeds became golden yellow in colour. Five sample plants were randomly selected and uprooted prior to harvesting from each plot excluding border rows. Grain and straw yields plot^{-1} were recorded after threshing by a pedal thresher, winnowing and drying in the sun properly including the grains and straws of the sample plants. The weight of grains was adjusted to 12% moisture content. Grain and straw yield were there converted to t ha^{-1}. Data were recorded from

the parameters viz. plant height (cm), number of total tillers hill^{-1}, effective tillers hill^{-1}, non-effective tillers hill^{-1}, number of grains panicle^{-1}, number of sterile spikelets panicle^{-1}, 1000-grain weight (g), grain yield (t ha^{-1}), straw yield (t ha^{-1}) and harvest index (%). Data were analyzed statistically and differences among treatments means were adjudged by Duncan's Multiple Range Test (DMRT) (Gomez and Gomez, 1984).

Results and Discussion

Plant height: Plant height was not significantly affected but the highest plant was 138.74 cm in case of V_8= BRRI dhan38 and the lowest one was 134.55 cm in case of V_6= BRRI dhan30 (Table 1). This finding compensated with the observation made by Sharma and Mitra (1990).

Table 1. Yield performance of some aromatic rice varieties in transplant *Aman* season

Variety	Plant height (cm)	Total tillers /hill	Effective tillers /hill	Non-effective tillers/hill	Length of panicle (cm)	Grains/ Panicle	Unfilled spikelets/ panicle	1000-grain wt(g)	Grain yield (t/ha)	Straw yield (t/ha)	Biological yield (t/ha)	Harvest index (%)
V_1	135.65	14.48	9.67b	4.81a	22.02	139.25bcd	31.00ab	11.25c	2.85c	5.08bc	7.93b	35.72e
V_2	136.80	14.20	10.13b	4.07ab	22.58	152.50abc	35.00a	13.62ab	2.88c	4.91bcd	7.79b	36.80de
V_3	134.64	14.49	10.28b	4.22ab	22.78	146.00bcd	31.50ab	12.19abc	2.69c	5.22b	7.90b	33.79e
V_4	136.41	14.55	9.88b	4.67ab	23.40	143.00bcd	22.50abc	11.80bc	3.10bc	5.13bc	8.23b	37.58cde
V_5	134.90	14.87	10.49b	4.38ab	23.15	143.00bcd	29.25abc	13.34abc	3.05bc	5.30b	8.35b	36.54de
V_6	134.55	14.82	11.81a	3.01c	23.65	166.75a	19.75c	14.25a	5.00a	6.40a	11.40a	43.85a
V_7	135.29	14.41	10.07b	4.34ab	23.10	134.00d	24.50abc	13.66ab	3.33bc	4.64cd	7.96b	41.77abc
V_8	138.74	14.49	10.19b	4.30ab	22.75	136.75cd	25.75abc	14.03ab	3.63b	4.53d	8.15b	44.42a
V_9	137.65	14.46	10.77b	3.69bc	23.20	154.75ab	24.50abc	13.77ab	4.50b	6.17a	10.67a	42.18ab
$S\overline{X}$	1.25	0.29	0.29	0.28	0.46	4.68	3.03	0.68	0.22	0.16	0.28	1.71
Level of Significance	NS	NS	0.05	0.01	NS	0.01	0.01	0.01	0.01	0.01	0.01	0.01
CV (%)	1.84	3.99	5.55	13.35	3.98	6.40	22.37	10.44	12.75	6.04	6.53	8.73

Number of total tillers hill^{-1}: Number of total tillers hill^{-1} was also not significantly affected. But the highest number of total tillers hill^{-1} was 14.87 and the lowest one was 14.20 from V_5= Jirashail and V_2= Tulsimala, respectively (Table 1).

Number of effective tillers hill^{-1}: Number of effective tillers hill^{-1} was significantly affected at 5% level of significance. The highest number of effective tillers hill^{-1} (11.81) achieved from V6 and the lowest (9.67) achieved from V1 (Table 1).

Number of non-effective tillers hill^{-1} : Number of non-effective tillers hill^{-1} was significantly affected at 1% level of significance. The highest number of non effective tillers hill^{-1} (4.81) achieved from V_1 and the lowest (3.01) achieved V_6 (Table 1).

Length of panicle: Length of panicle was not significantly affected. But the highest panicle length (23.65 cm) has come from V_6 and the lowest (22.02 cm) achieved from V_1 (Table 1).

Number of grains panicle^{-1}: Number of grains panicle^{-1} was significantly affected at 1% level of significance. The maximum number of grains panicle^{-1} (166.75) has achieved from V_6 and the minimum number of grains panicle (134.00) observed from V_7 treatment. (Table 1).

Number of unfilled spikelets panicle^{-1}: Number of unfilled spikelets panicle^{-1} was significantly affected at 1% level of significance. The highest number of unfilled spikelets panicle^{-1} (35.00) achieved V_2 and the lowest number of unfilled spikelets panicle^{-1} (19.75) has achieved from V_6 (Table 1).

1000-grain weight: 1000-grain weights were significantly affected at 1% level of significance. The highest 1000-grain weight (14.25 g) achieved from V_6 and the lowest 1000-grain weight (11.25 g) has achieved from V_1 (Table 1). Present results are in agreement with that of Islam *et al*., (1990).

Grain yield: Grain yield was significantly affected at 1 % level of significance. The highest grain yield (5.00 t ha^{-1}) achieved from V_6 and the lowest grain yield (2.85 t ha^{-1}) achieved from V_1 (Table 1). Increasing grain yield due to application of Nitrogen was reported by Singh *et al*. (1991).

Straw yield: Straw yield was significantly affected at 1% level of significance. The highest straw yields (6.40 and 6.17 t ha-1) have achieved from V_6 and V_9 which were statistically identical and the lowest straw yield (4.53 t ha^{-1}) from V8 (Table 1).

Biological yield: Biological yield was statistically influenced in 1% level of significance. The highest biological yields (11.40 and 10.67 t ha-1) have achieved from V_6 and V9 which were statistically identical and the lowest biological yield (7.93, 7.79, 7.90, 8.23, 8.35, 7.96 and 8.15 t ha^{-1}) from V_1 through V_5; and V_7 and V_8 which were statistically identical (Table 1).

Harvest Index (HI): Harvest index was statistically influenced in 1% level of significance. The highest harvest index (43.85% and 44.42%) was observed from V_6 and V_8; and the lowest harvest index (33.79% and 35.72%) observed from V_3 and V_1 which was statistically identical (Table 1).

From the above results it is concluded that the highest grain yield (5.00 t ha^{-1}), straw yield (6.40 t ha^{-1}), number of effective tillers hill^{-1} (11.81) and total number of grains panicle^{-1} (166.75) were found in V_6 (BRRIdhan 30) treatment and the lowest grain yield (2.69 t ha^{-1}), straw yield (4.53 t ha^{-1}), number of effective tillers hill^{-1} (9.67)

and total number of grains panicle^{-1} (134.00) were recorded from V_3 (Badshabhog), V_8 (BRRIdhan 38)and V_1 (Kalojira) treatment, respectively. From the findings of the present study, it may also be concluded that aromatic rice cv. BRRIdhan 30 (V_6) appears to be better than other varieties.

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